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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/511,865

03/10/2005

Robert E. Lo

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06/24/2008

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EXAMINER

MCDONOUGH, JAMES E

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

06/24/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/511,865	Applicant(s) LO ET AL.	
	Examiner JAMES E. MCDONOUGH	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-19, 22-34 and 37-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-19, 22-34, 37-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

New Rejections

Claims 17, 19, 22-31, 33, 34, and 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynolds (US Patent No. 3,259,532) in view of Grosse et al. (US Patent No. 3,137,127) in further view of Stickler (US Patent No. 5,529,648).

Regarding claims 17, 19, 22-27, 30, 31, 33, and 37-39

Reynolds teaches the use of a carbonaceous substance dispersed in liquid oxygen. This mixture is then incorporated into the interstices of a metal sponge that inherently has hollow spaces of a size that would affect the combustion speed (preferably aluminum or magnesium) (column 1, line 44 to column 2, line 5).

Although, Reynolds does not teach the use of a open pore plastic foam, Reynolds does teach the use of open pore metal foams. However, because Stickler teaches a rocket engine having a continuous solid matrix, which compares to the metal foam of Reynolds as it is also a continuous solid matrix fuel, and teaches that this is preferably a combustible polymeric material, such as HTPB (column 4, lines 38-60), it would have been prima facie obvious to one of ordinary skill in the art at the time of invention to modify the basic teaching of Reynolds by substituting a plastic material for the metal material of the foam of Reynolds, with a reasonable expectation of success, as suggested by Stickler, and further taking into account that the skilled artisan would appreciate that 1.) A plastic would be lighter than a metal, and give weight benefits to a rocket and 2.) The skilled artisan would appreciate that polymers being of high molecular weight, give much benefit to rockets as it understood that there will be a great

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entropy effect generated by the loss of order and gain of randomness associated with combustion of very large molecules, and would serve to increase the impulse of the engine. 3.) In the art of energetic materials it is well understood that both metals and polymers (organics) can act as fuels, and it is obvious to substitute one component for a given use for another component for that same use, absent any evidence of unexpected results.

Although, Reynolds does not explicitly disclose the freezing of the liquid oxygen to form a solid monergole propellant, Reynolds does disclose that the liquid oxygen suspension can be incorporated into the interstices by either directly pouring of the suspension onto the sponge or by immersing the sponge in the suspension (column 2, line 34 to column 2, line 49). However, because Grosse et al. disclose the use of a fuel/oxidizer or both that are normally gaseous or liquid at room temperature being frozen solid for use as a rocket motor (column 1, line 14 to column 1, line 47) giving the advantage of having a high specific impulse as normal for liquid fuel engines without the typical draw backs such as extra plumbing, valves, and separate containers for the fuel and oxidizer associated with liquid fuel rocket engines (column 1, line 48 to column 2, line 6), It is prima facie obvious to combine two or three compositions, each taught for the same purpose to yield a third composition for that very purpose. In re Kerkhoven, 205 USPQ 1069, In re Pinten, 173 USPQ 801, and In re Susi, i69 USPQ 423.

Also, it would have been obvious to someone of ordinary skill in the art at the time of the invention to change the size of the hollow spaces in the sponge, thereby affecting the rate of combustion by changing the surface area, since the reaction

kinetics of solid reactants are primarily controlled by the available surface area of said reactants. As to limitations which are considered to be inherent in a reference, note the case law of *In re Ludke*, 169 USPQ 563; *In re Swinehart*, 169 USPQ 226, *In re Fitzgerald*, 205 USPQ 594; *In re Best et al*, 195 USPQ 430; and *In re Brown*, 173 USPQ 685,688.

Regarding claims 28, 29, 34, 40, and 41

Neither Reynolds nor Grosse et al. explicitly disclose the use of an initially encapsulated liquid that is then bonded with the solid structure then frozen. However, because Stickler teaches the use of a dispersion of encapsulated liquid within a solid fuel matrix (column 3, line 60 to column 4, line 5) and Grosse et al. disclose the use of a fuel/oxidizer or both that are normally gaseous or liquid at room temperature being frozen solid together for use as a rocket motor (column 1, line 14 to column 1, line 47), it is prima facie obvious to combine two or three compositions, each taught for the same purpose to yield a third composition for that very purpose. *In re Kerkhoven*, 205 USPQ 1069, *In re Pinten*, 173 USPQ 801, and *In re Susi*, 169 USPQ 423.

Claims 18 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reynolds (US Patent No. 3,259,532) in view of Grosse et al. (US Patent No. 3,137,127) in view of Stickler (US Patent No. 5,529,648), as applied to claims 17, 19, 22-31, 33, 34, and 37-41 above, in further view of Krivohlavek (USP 5,834,539).

Although, neither Reynolds or Grosse et al. teach the use of an emulsion of liquids that are not soluble together, Reynolds and Grosse et al. teach the rest of the

limitations of the claims. However, because Kreivohlavek teaches that energetic materials comprising emulsions burn, combust, or explode with greater efficiency (column 1, lines 34-38), it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the teachings of these three references with a reasonable expectation of success and the expected benefit of producing a more efficient rocket propellant.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reynolds (US Patent No. 3,259,532) in view of Grosse et al. (US Patent No. 3,137,127) in view of Stickler (US Patent No. 5,529,648), as applied to claims 17, 19, 22-31, 33, 34, and 37-41 above, in further view of Keilbach et al. (US Patent No. 3,691,769).

Although, neither Reynolds nor Grosse et al. explicitly disclose the use of a protective coating on the solid phase to chemically insulate the two reactants from one another. However because Keilbach et al. disclose that metals when mixed with an oxidizer in a rocket engine need to be protected from oxidation (column 4, line 16 to column 4, line 33), it is prima facie obvious to combine two or three compositions, each taught for the same purpose to yield a third composition for that very purpose. In re Kerkhoven, 205 USPQ 1069, In re Pinten, 173 USPQ 801, and In re Susi, i69 USPQ 423.

Response to Arguments

Examiner thanks applicants for pointing out that the text of the rejection of claims 18 and 32 was inadvertently left out of the last office action.

Applicants argue that none of the references alone or in combination disclose or suggest the use of an open pore plastic foam. This is not persuasive and applicant's attention is directed towards the new rejection above.

Applicants argue that all of the references are directed towards hypergols or explosives, and not to monergols as claimed, and that it is improper to substitute monergol for monopropellant, and that as such the prior art is non-analogous art. This is not persuasive because, the references and the instant invention are directed towards energetic materials, and it is well known that many energetic materials can have different uses, such as propellant, explosives, fuels, gas generators, etc.

Applicants argue that even though Reynolds teaches that this composition can be used as a propellant, Reynolds does not teach that it is a monergol. This is not persuasive because the reference does not have to use the same terminology as the instant invention to anticipate it or make it obvious.

Applicants argue that metal sponge is different than plastic sponge. This argument is moot based on the new rejection above.

Applicants argue that since wikipedia does not teach that explosives and propellants are mutually suitable, the skilled artisan would not think they are combinable. This is not persuasive for at least the following: 1.) Wikipedia is not the definitive scientific reference for anything. 2.) The skilled artisan would appreciate that many energetic materials are more than one use, as applicants even admit that Reynolds teaches that his invention can be used in explosives or propellants, this would lead one skilled in the art to believe that energetic materials can have more than one purpose. 3.) This can be seen with C-4 explosives, although this is the standard military high explosive, if it is simply ignited with a match or lighter it will burn clean and slow, and soldiers in the field even use this to heat their food, again showing energetic materials can have more than one use.

Applicants argue the examiner has used improper hindsight analysis. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicants argue that Grosse teaches hypergoles so therefore can not be combined with the Reynolds reference. This is not persuasive for at least the following: 1.) The examiner can find no place in Grosse that teaches a hypergole. 2.) Grosse is directed towards a solid bipropellant that is made of mixed solid oxidizers and solid fuels (column 1, lines 10-20), if it was hypergolic, as alleged by applicants, it would spontaneously ignite before it could be loaded into the rocket engine.

Applicants argue that since they do not teach a size like Grosse, that Grosse must only be able to take a precise shape. This is not persuasive because the examiner can find no logic that relates size restrictions to shape restrictions.

Applicants argue that their invention is a single component fuel. This is not persuasive because, the invention requires more than one component to function, and applicants are further reminded that at least claim 25, also teaches a hydrocarbon, and is this not more than one component?

Applicants argue that the coating layers of the instant invention and the reference of Keilbach are used for different purposes. This is not persuasive and applicants are reminded that a reference does not have to have the same reasoning as the instant invention to make a limitation obvious.

Applicants argue that the examiner is taking their statements out of context, as their invention relates exclusively to monergoles, not multi component systems. This is not persuasive because if the invention of the reference (i.e. basically liquid frozen in a sponge) is a monergole, then how is it that the invention of Reynolds (i.e. also basically a liquid frozen in a sponge) not also a monergole. It appears based on applicants own arguments that they may be confused with the definitions of these words and the examine is not trying to take these out of context.

Applicants argue feeding a multi phase emulsion into a combustion chamber by pumps would lead to its degradation. While it is understood that an emulsion being fed into a combustion chamber is being degraded (i.e. combustion), however it is not understood how feeding through a pump will automatically degrade an emulsion.

Applicants argue that Krivohlavek is not analogous art. This is not persuasive for the same reason given above.

Applicants argue that shrink hole formation is prevented by pre-cooling. This is not persuasive for at least two reason: 1.) This is not claimed, and the examiner can find no support for this in the specification as originally filed. 2.) Applicants have not shown that the reference will have these shrink holes upon cooling.

Applicants argue that they are not claiming any polygolic propellants, nor any multicomponent propellants, nor any multi-phase emulsions. This is not persuasive at least because in claim 33, applicants are claiming a suspension of solid components in liquid components. This begs the question, do applicants define solid in liquid as a single component and are liquid and solids not two separate phases (i.e. multi phase)?

Applicants continue to argue that propellant can not be explosives and vice versa. The examiner would like to point out several quick examples such as the Challenger (A united states space shuttle, which has rocket engines blew up during take off, accidental detonation of rocket propellant), and many of the test of the Apollo and Gemini programs, and applicants are reminded that there were no SERIOUS MODIFICATIONS needed for these explosions.

Applicants argue that the examiner has used an ARBITRARY number of references. Applicants are reminded that more references do not way against the validity of a rejection.

Applicants argue that since the references are old that somehow makes their invention more patentable. Applicants are reminded that the date of a reference not being current does not make an invention any more novel or unobvious.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES E. MCDONOUGH whose telephone number is (571)272-6398. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793

JEM 6/19/2008